

1976: The Discovery of the J/ψ Meson



Burton Richter (1931 -)



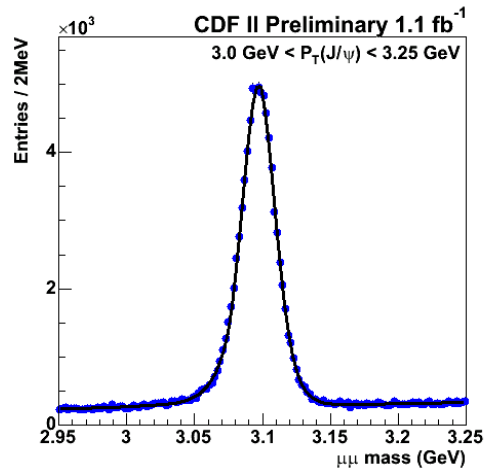
Samuel C. C. Ting (1936 -)

About

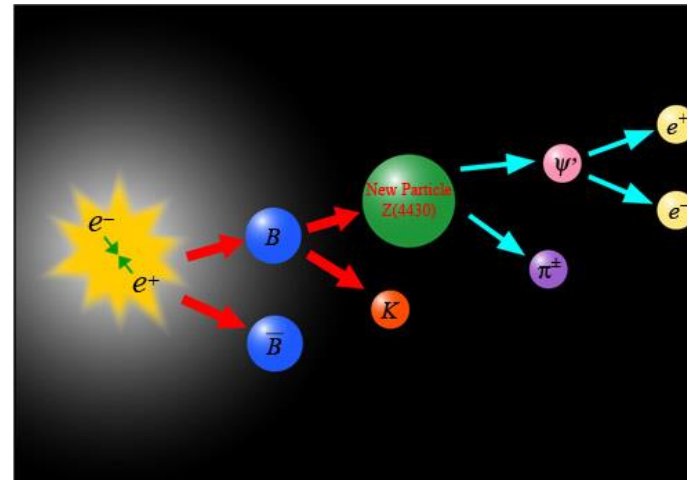
- Subatomic particle, a flavor-neutral meson consisting of a charm quark and a charm antiquark
- Mesons formed by a bound state of a charm quark and a charm antiquark are generally known as charmonium
- First excited state of charmonium
- The form of charmonium with the second-smallest rest mass
- Rest mass of $3.0969 \text{ GeV}/c^2$ and a mean lifetime of $7.2 \times 10^{-21} \text{ s}$

Nobel Prize Winner

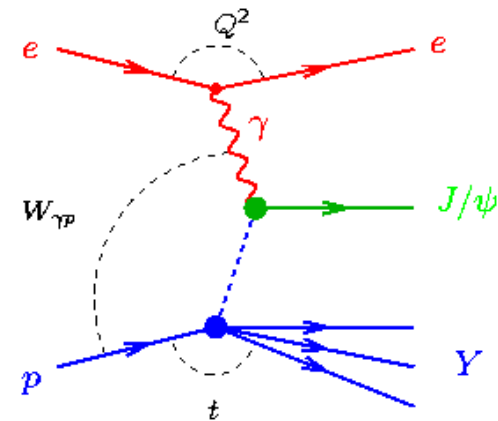
- The Nobel Prize in Physics 1976
- Discovered by Burton Richter and Samuel C. C. Ting
- Given the Nobel Prize “for their pioneering work in the discovery of a heavy elementary particle of a new kind”



J/ψ Production at Fermilab



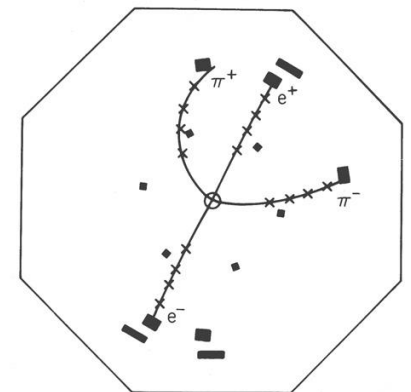
Decay sequence from a Z(4430) Particle to a J/ψ Meson



Diffractive Photoproduction of J/ψ Mesons with Large Momentum Transfer at HERA

Discovery

- Made independently by two research groups (Stanford Linear Accelerator Center and Brookhaven National Laboratory)
- Announced on 11 November 1974
- Both theoretical and experimental discovery
- Work was originally being done mostly to explore new energy regimes
- Showed that there was a fourth quark (charm) that paired with a strange quark just like an up quark pairs with a down quark



Decay of a Psi-prime meson into J/Psi, π⁺, and π⁻ mesons